

Welcome

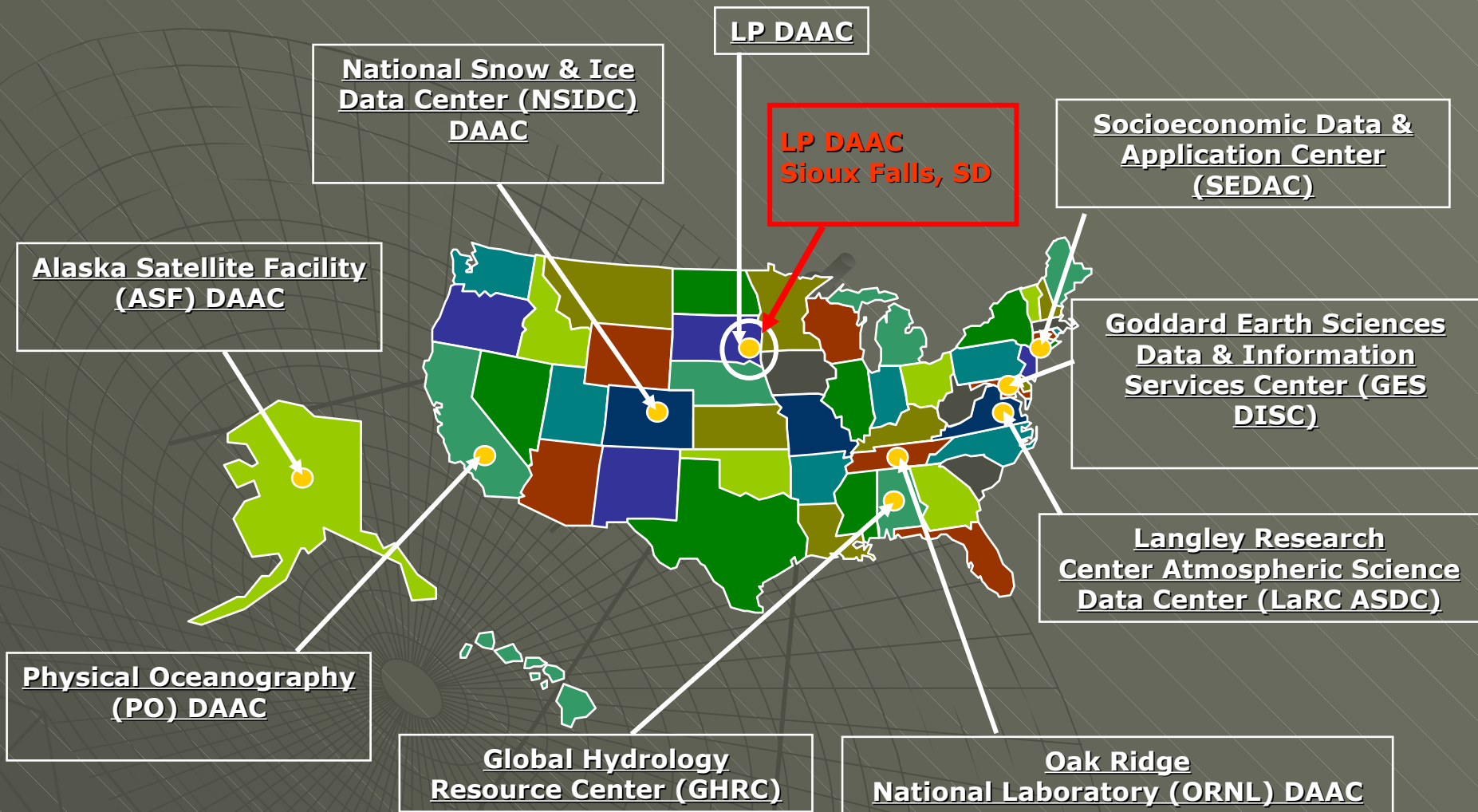
To The

Land Processes DAAC Suite of On-line Workshops

LP DAAC Introduction to MODIS Data


Welcome to the LP DAAC introduction to MODIS data workshop

- ◆ The following topics will be presented:
 - What is the LP DAAC and where can I find information?
 - What types of data are distributed by the LP DAAC?
 - What are the characteristics of MODIS?
 - Where can I order MODIS?




LP DAAC Web Site

<https://lpdaac.usgs.gov>



science for a changing world



LP DAAC

LAND PROCESSES DISTRIBUTED ACTIVE ARCHIVE CENTER


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ATTENTION: Welcome to the LP DAAC Website!

WELCOME




Products

Download the satellite images and data for the time periods 1982 and 1983.




Get Data

Guides you through the steps needed to acquire the satellite images.




Tools

Download the data you need to work with the data.



User Community

A place to share your data and ideas.



Customer Service

Have a question? Our staff is happy to help.


News

08/03/2009
[New MODIS 500 meter Land-Water Mask](#)

07/30/2009
[LP DAAC GIBL Distribution Milestone / Re-distribution Update](#)

07/29/2009
[The LP DAAC is discontinuing ASTER SWIR data access](#)

07/01/2009
[Change in Status Alert for the ASTER SWIR dataset](#)


[Read more news.](#)

NASA and USGS Partnership


The Land Processes Distributed Active Archive Center (LP DAAC) is one of several discipline-specific data centers within the NASA Earth Observing System Data and Information System (EOSDIS). The LP DAAC is located at the USGS Earth Resources Observation and Science (EROS) Center in Sioux Falls, South Dakota.


Data in Action

Ash Eruptions from Sarychev Peak, Kuril Islands
08/18/2009



At the northwestern end of Ostrov Iturup (Iturup Island), Sarychev Peak ranks among the most active volcanoes in the Kuril (or Kurile) Islands, which stretch between Hokkaido, Japan, and Russia's Kamchatka Peninsula. On June 12, 2009, Sarychev Peak began a series of eruptions that spread ash far and wide across the northwestern Pacific.

[Read original article.](#)

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LAND PROCESSES DISTRIBUTED ACTIVE ARCHIVE CENTER

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Accessibility FOIA Privacy Policies and Notices

What type of data products does the LP DAAC provide?

- ◆ The LP DAAC archives, produces, and distributes ASTER and MODIS data.
 - Advanced Spaceborne Thermal Emission and Reflective Radiometer (ASTER)
 - MODerate resolution Imaging Spectroradiometer (MODIS)
- ◆ Data are available in the Hierarchical Data Format – Earth Observing System (HDF-EOS) format.

ASTER and MODIS Data



MODIS image of fires near Athens, Greece

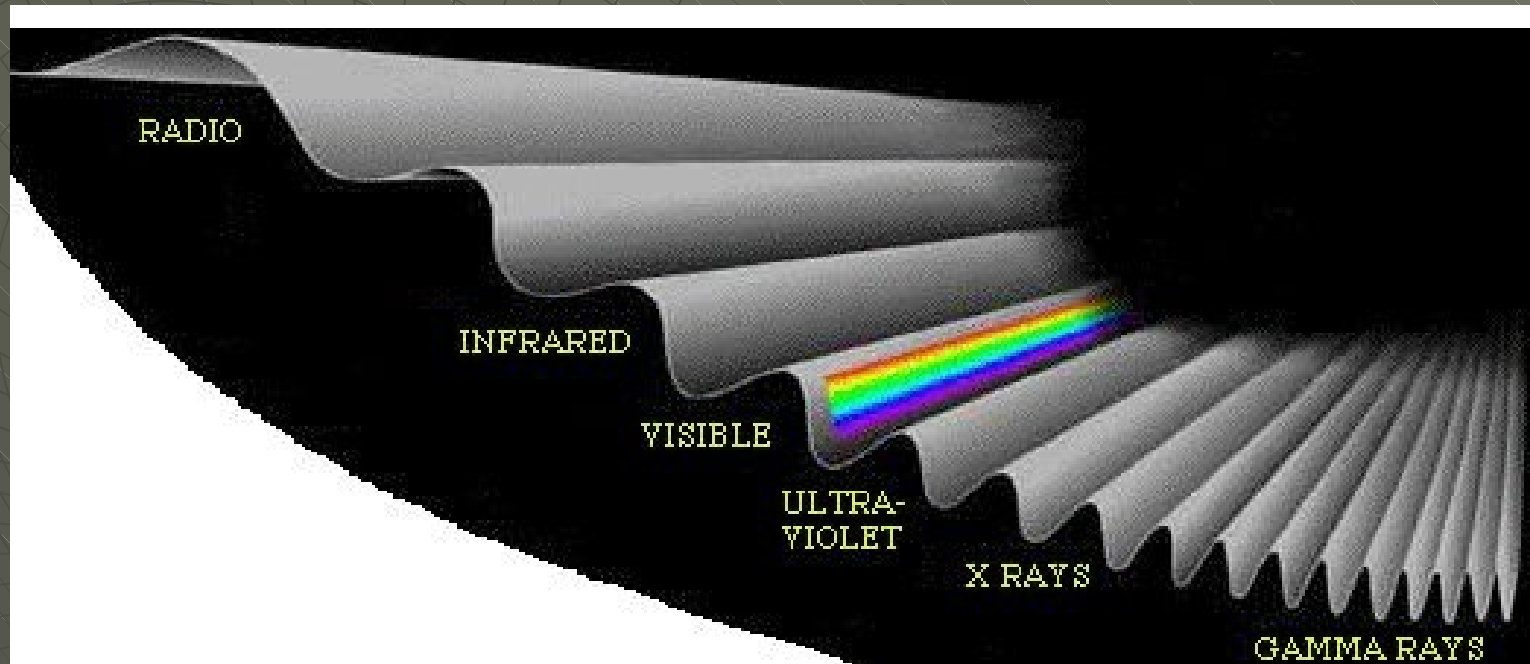
- ◆ Acquired August 22, 2009
- ◆ Smoke from wildfires can be seen in image center

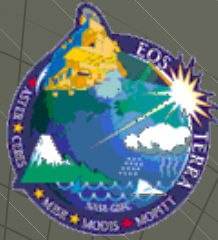


ASTER image of Mount Redoubt, Alaska

- ◆ Acquired May 5, 2009
- ◆ A steam plume can be seen in image center

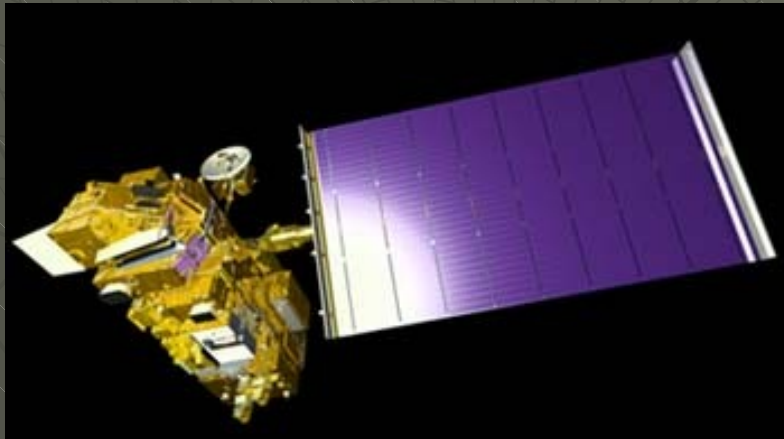
The Electromagnetic Spectrum





Terra Satellite

- ◆ LAUNCH: December 18, 1999 from Vandenberg AFB
- ◆ ORBIT: Sun-synchronous near-polar 705 km (438 miles)
- ◆ EQUATOR CROSSING: 10:30 a.m. descending
- ◆ DESIGN LIFE: 6 years





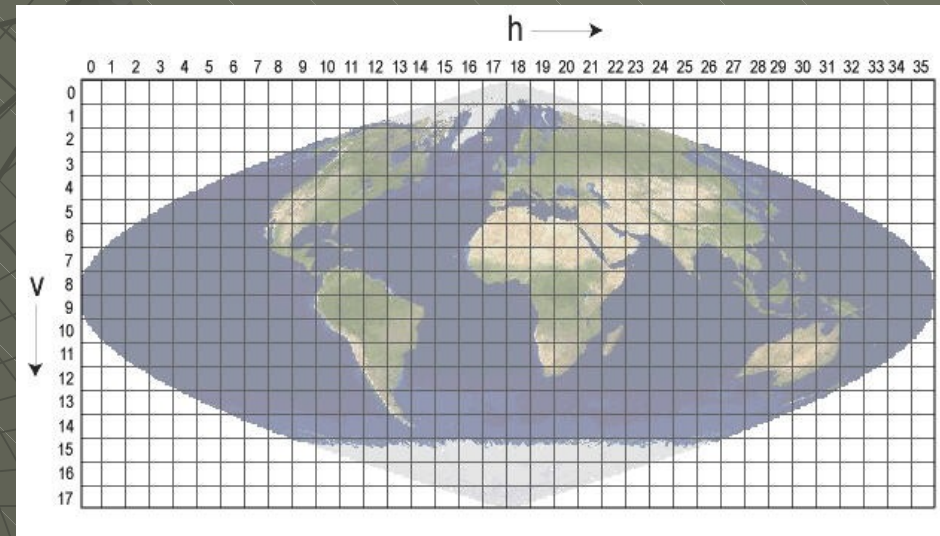
Aqua Satellite

- ◆ LAUNCH: May 4, 2002 from Vandenberg AFB
- ◆ ORBIT: Sun-synchronous near-polar 705 km (438 miles)
- ◆ EQUATOR CROSSING: 10:30 a.m. ascending
- ◆ DESIGN LIFE: 6 years



What are the characteristics of MODIS data?

- ◆ 1-2 day coverage of the Earth
- ◆ Processed in $10^\circ \times 10^\circ$ tiles
- ◆ Collected in the ISIN Projection

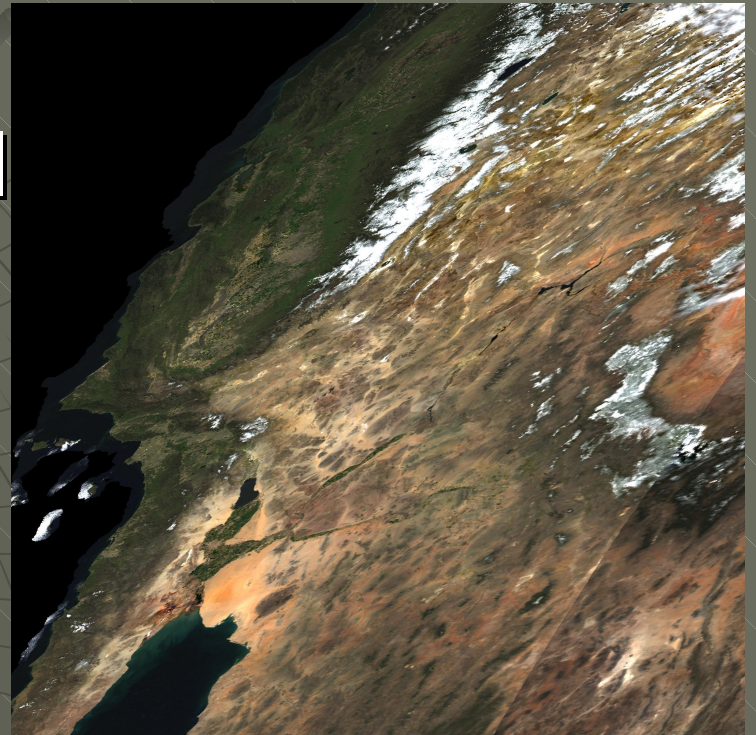


Sinusoidal Grid (including horizontal and vertical tile numbers).

What are the characteristics of MODIS data?

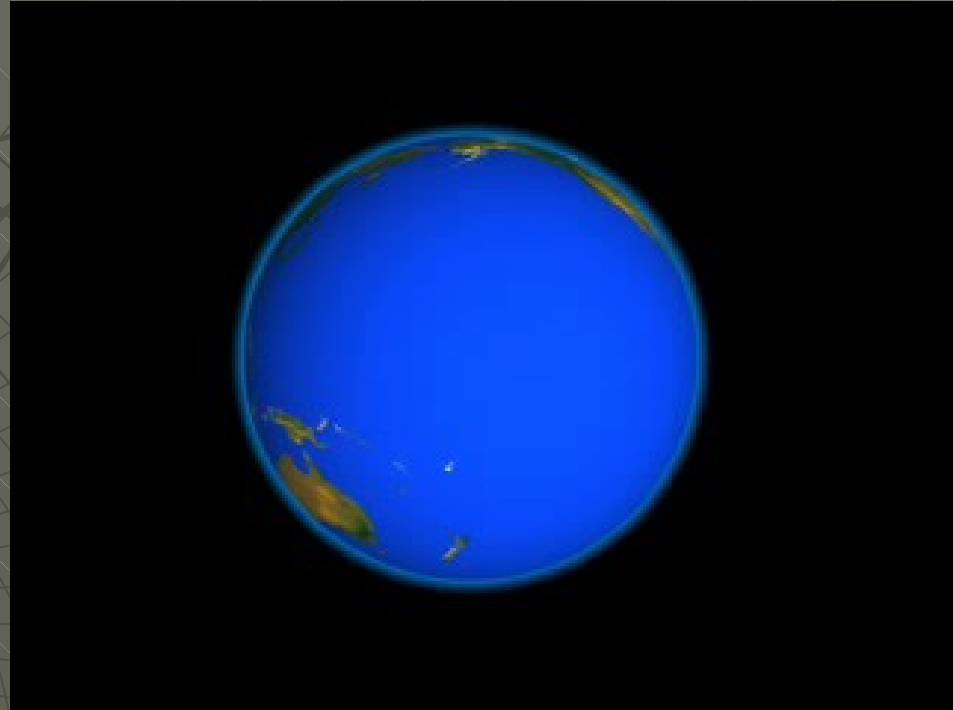
◆ Sinusoidal Tile Example

- Terra Level-3
- Surface Reflectance
- Tile ID h08-v05



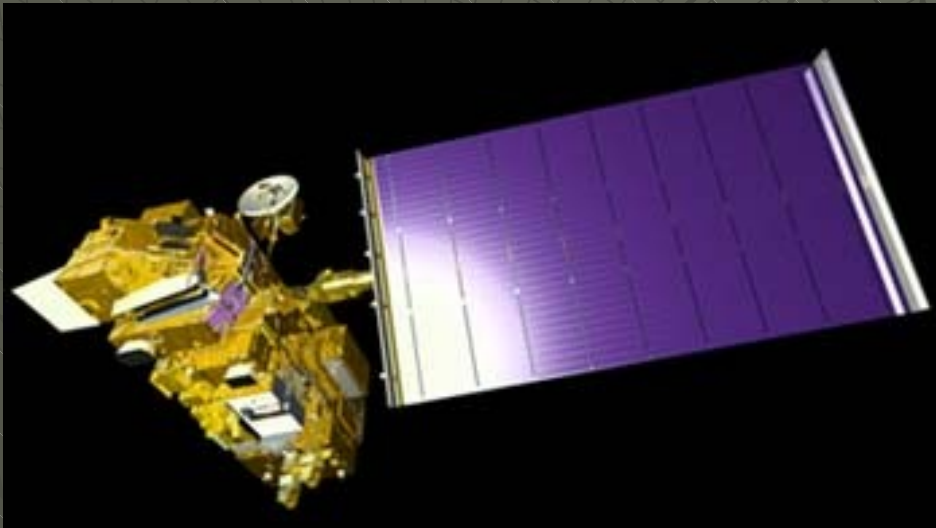
What are the characteristics of the MODIS sensor?

- ◆ 36 bands cover a spectral range from 0.4 to 14.4 micrometers
 - MODIS Bands 1,2
 - ◆ 250 meter resolution
 - MODIS Bands 3,4,5,6,7
 - ◆ 500 meter resolution
 - MODIS Bands 8-36
 - ◆ 1,000 meter resolution



MODIS Data

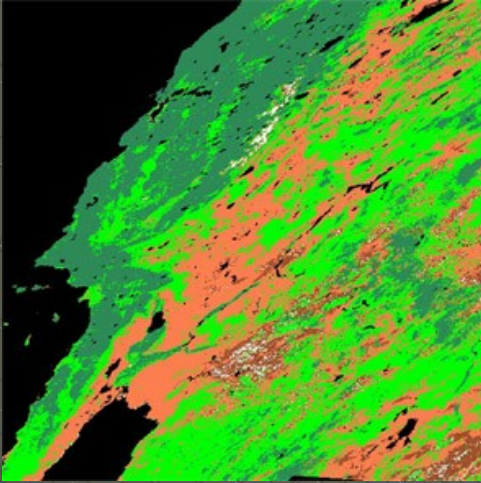
- ♦ MODIS data products are archived at the LP DAAC as Level-2, Level-2G, Level-3, and Level-4 data.
- ♦ MODIS Level-2 products are swath data.
- ♦ Level-2G, Level-3, and Level-4 products are gridded data.
- ♦ MODIS is distributed in the HDF-EOS format.
- ♦ Available as a daily product or in 8-day, 16-day, 32-day, 64-day, monthly, quarterly, or annual composites.



MODIS Characteristics – Data Levels

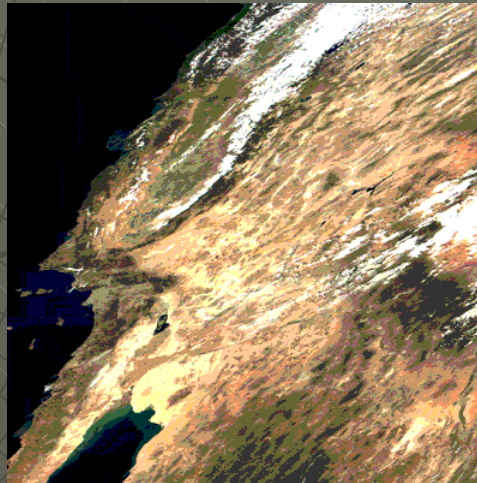
- ◆ MODIS Level-2 data have derived geophysical variables at the same resolution and location as Level-1 source data.
 - LP DAAC MODIS Level-2 data are swath products.
- ◆ MODIS Level-2G data are mapped on uniform space-time grid scales.
- ◆ MODIS Level-3 data are variables mapped on uniform space-time grid scales in derived spatial and/or temporal resolutions.
- ◆ MODIS Level-4 data are model output or results from analyses of lower-level data.

MODIS Data Types



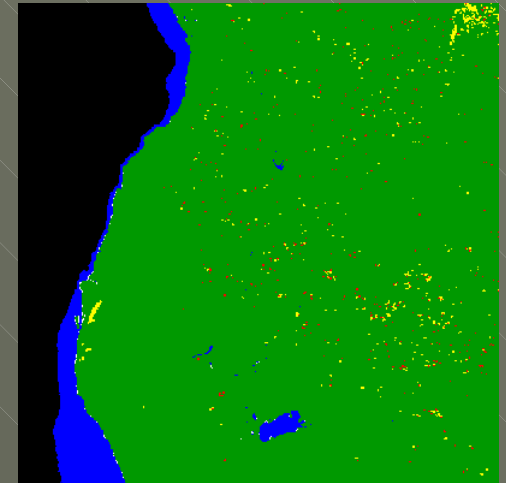
◆ Ecosystem

- Vegetation Index
- Leaf Area Index/FPAR
- Primary Productivity



◆ Radiation & Reflectivity

- Surface Reflectance
- BRDF/Albedo
- Land Surface Temperature/Emissivity



◆ Land Cover

- Thermal Anomalies/Fire
- Burned Area
- Land Cover
- Water Mask

MODIS Naming

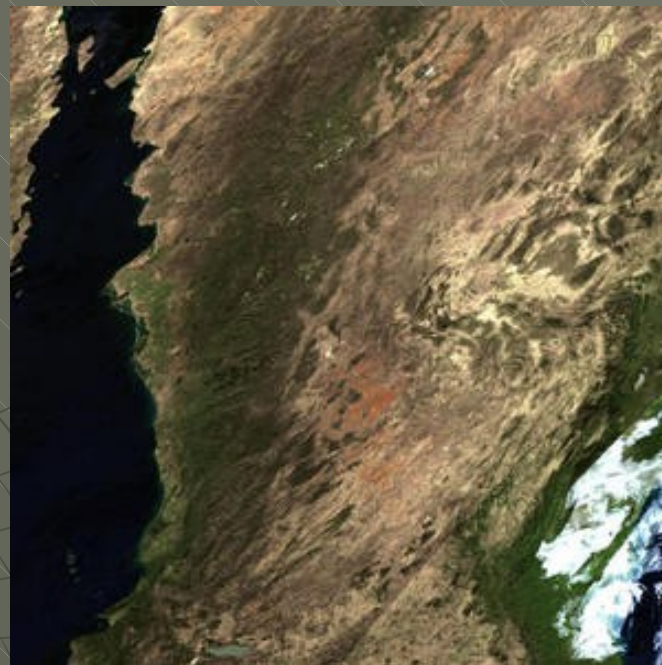
- ◆ Name beginning with...
 - MOD are data from the Terra sensor
 - MYD are data from the Aqua sensor
 - MCD are combined Terra and Aqua data

MODIS Names

◆ MOD/MYD	09	Surface Reflectance
◆ MOD/MYD	11	Land Surface Temperature / Emissivity
◆ MOD/MYD/MCD	12	Land Cover / Change
◆ MOD/MYD	13	Vegetation Indices
◆ MOD/MYD	14	Thermal Anomalies / Fire
◆ MOD/MYD/MCD	15	Leaf Area Index / FPAR
◆ MOD/MYD	17	Gross Primary Production
◆ MOD/MCD	43	BRDF / Albedo
◆ MOD/MYD	44	Vegetation Continuous Fields
◆ MCD	45	Burned Area

MODIS Data Types

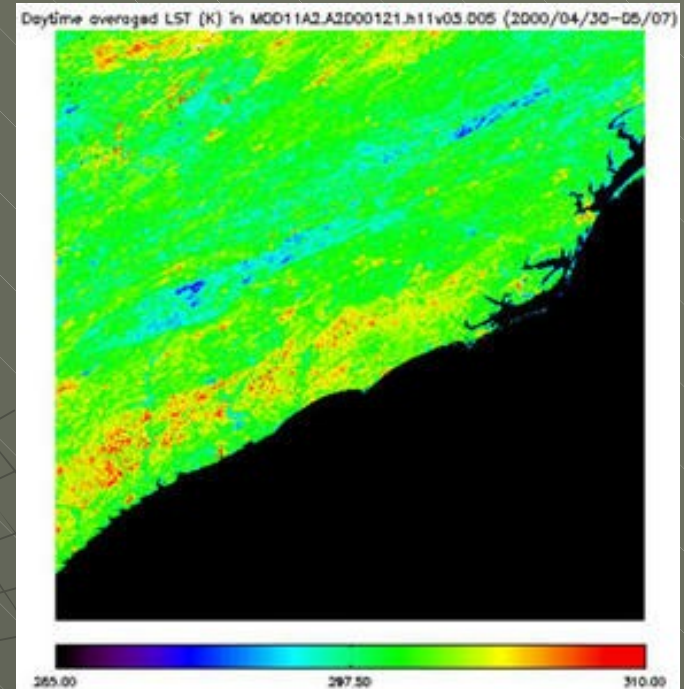
- ◆ Surface Reflectance
 - 10 total products available as Terra and Aqua.
 - Products at 250m, 500m, 1000m, and 5600m.
 - Products in daily and 8-day composites.



Much of Mexico can be seen in this Surface Reflectance composite using 500-meter data acquired between January 1-8, 2007. (h08v06)
Bands 1,4,3 (RGB)

MODIS Data Types

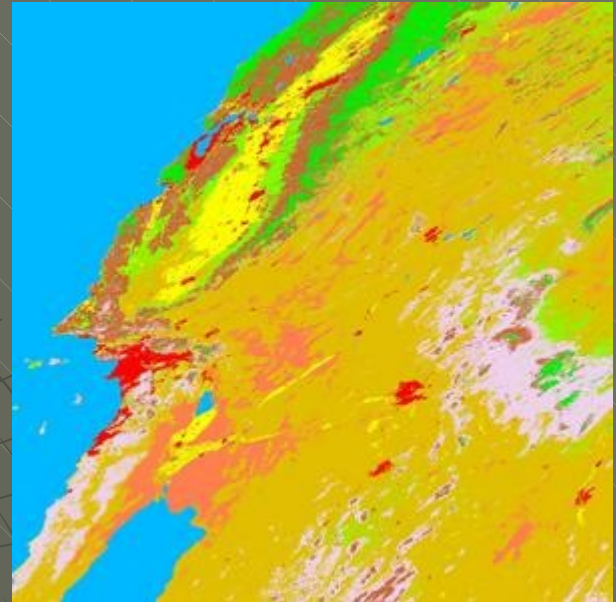
- ◆ LST & Emissivity
 - 14 total products available as Terra and Aqua.
 - Products at 1000m, 5600m, and 6000m.
 - Products in 5 min swath, daily, and 8-day and monthly composites.



This false-colored MOD11A2 image shows the 8-day average values of daytime clear-sky LSTs retrieved from MODIS data in the period of April 30 May 7, 2000 over the eastern coast of the United States.

MODIS Data Types

- ◆ Land Cover Type
 - 1 product available as Combined Terra and Aqua.
 - Product at 500m resolution.
 - Product in a yearly composite.



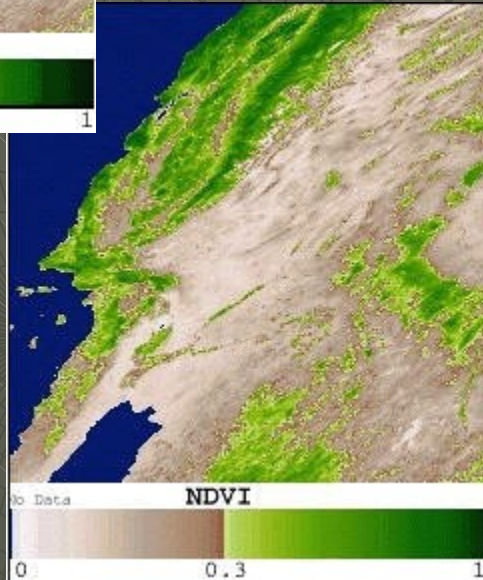
This image represents the 2005 land cover types for the western United States (h08/v05). This first SDS layer depicts the IGBP classification.

MODIS Data Types

- ◆ Vegetation Indices
 - 12 products available as Terra and Aqua.
 - Products at 250m, 500m, 1000m, and 5600m.
 - Products in 16-day and monthly composites.



The MOD13A1 images shown are EVI and NDVI samples of the MODIS/Terra Vegetation Indices 16-Day L3 Global 500m SIN Grid.



MODIS Data Types

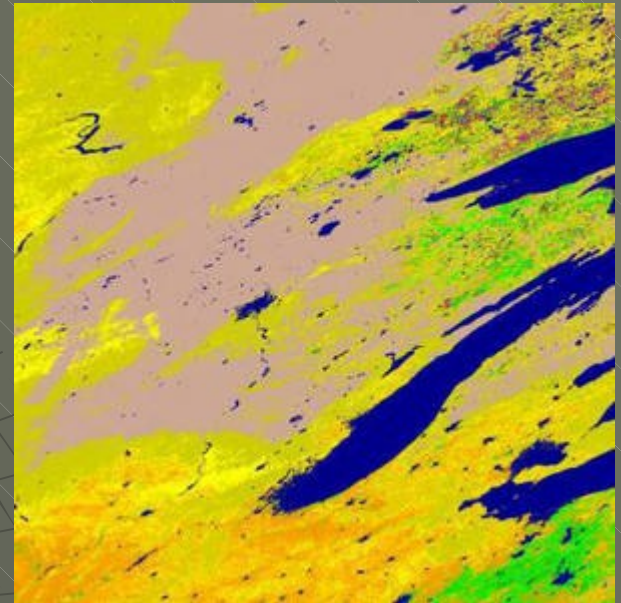
- ◆ Thermal Anomalies/Fire
 - 6 total products available as Terra and Aqua.
 - Products at 1000m.
 - Products in 5 min swath, daily, and 8-day composites.
- ◆ Burned Area
 - 1 Combined product available at 500m.
 - Product in a monthly composite.



This image represents fire indications composited March 6 13, 2007, an 8-day period during which the southern U.S. was subjected to numerous prescribed burns. This image is a subset of tile h10v05 (Southeastern U.S.).

MODIS Data Types

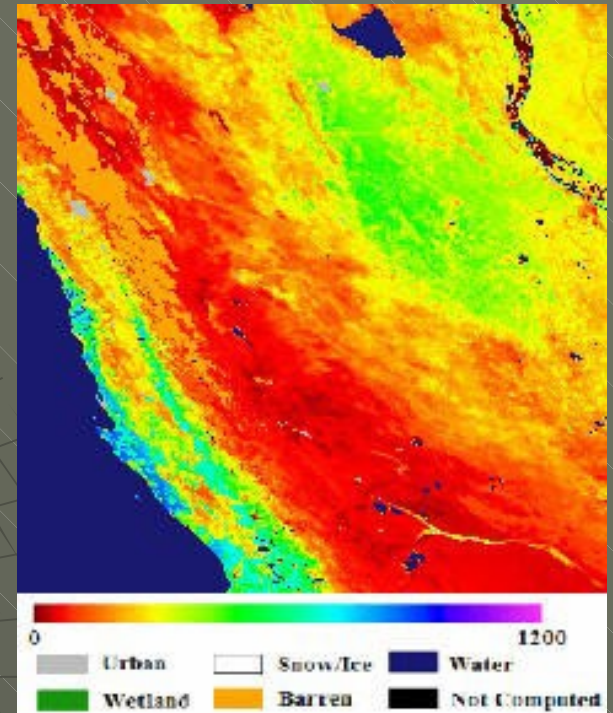
- ◆ Leaf Area Index/FPAR
 - 3 total products available as Terra and Aqua.
 - Products at 1000m.
 - Products in 8-day composites.



This image is pseudo-colored to display the Fraction of Photosynthetically Active Radiation (FPAR) calculated over north-central U.S. These data were collected between March 6-13, 2007.

MODIS Data Types

- ◆ Net Primary Productivity
 - 2 total products available as Terra and Aqua.
 - Products at 1000m.
 - Products in 8-day composites.

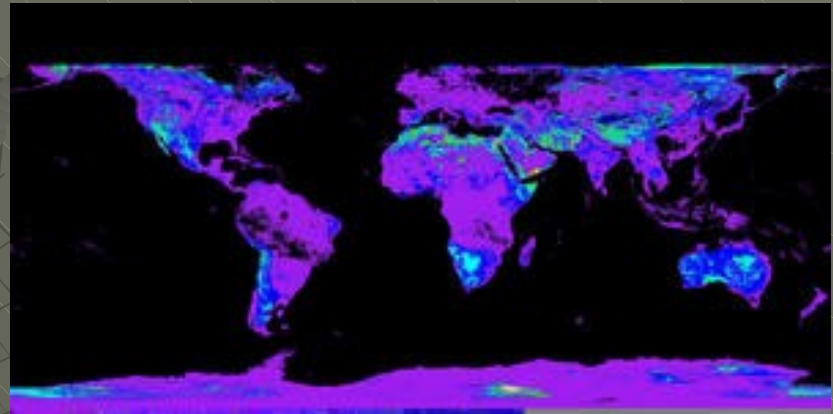


This image is an example of the GPP values reported in the MOD17A2 product data acquired February 10, 2007 in tile h12v12 over Chile and Argentina.

MODIS Data Types

◆ BRDF/Albedo

- 9 total products available as Combined Terra and Aqua.
- Products at 500m, 1000m, and 5600m.
- Products in 16-day composites.



The image above is a representation of the third of the three model parameters used to reconstruct surface anisotropic effects and thus correct directional reflectances to a common view geometry, or to compute integrated albedos. The colors describe the geometric LiSparseR (fgeo) weighting parameters for data acquired between January 17 and February 1, 2007.

MODIS Data Types

- ◆ MOD 44 Data Types
 - Vegetation Continuous Fields
 - ◆ 1 Terra products available.
 - ◆ Product at 500m resolution.
 - ◆ Product in a yearly composite.
 - Land Water Mask
 - ◆ 250m land-water mask
 - ◆ Available as tiles

What are some applications for MODIS data?

- ◆ MODIS science investigations include the following areas:
 - Land surface climatology
 - Monitoring volcanoes
 - Hazards monitoring
 - Carbon cycle
 - Geology and soils
 - Aerosols and clouds
 - Hydrology

Vegetation Mapping



Disaster Management

September 14, 2003

Puerto Rico



September 16, 2003

Bahamas



September 18, 2003

U.S. East Coast



Deforestation



How do I order MODIS data from the LP DAAC?

- ◆ Visit the "Get Data" area of the LP DAAC Web site.
- ◆ Warehouse Inventory Search Tool (WIST)
<https://wist.echo.nasa.gov/~wist/api/imswelcome/index.html>
 - Delivers all EOS data sets and meets all user needs
 - User Logins to allow saved searches and preferences
- ◆ Global Visualization Viewer (GloVis) <http://glovis.usgs.gov/>
 - Browse-based tool for available MODIS data sets
 - Point and click client
- ◆ Data Pool https://lpdaac.usgs.gov/lpdaac/get_data/data_pool
 - Data cached (300 TB) for immediate download
 - Search capabilities exist, along with simple folder-based directory structure
- ◆ MRTWeb https://lpdaac.usgs.gov/lpdaac/get_data/mrtweb
 - Combines the GloVis interface with the reprojection and mosaicking capabilities of the MODIS Reprojection Tool.

LP DAAC Introduction to MODIS Data

- ◆ Please continue to learn additional information on LP DAAC products by visiting the following On-Line Workshops.
 - Introduction to the Earth Observing System and LP DAAC
 - LP DAAC ASTER Data Workshop

Acknowledgements

- ◆ Earth Observing System (EOS)
- ◆ Earth Remote Science Data Analysis Center (ERSDAC)
- ◆ EOS Data & Information System (ESODIS)
- ◆ EOS TERRA Satellite
- ◆ Japanese Ministry of Economy, Trade and Industry (METI)
- ◆ Land Processes Distributed Active Archive Center (LP DAAC)
- ◆ National Aeronautics and Space Administration (NASA)
- ◆ NASA Earth Observatory
- ◆ NASA Goddard Space Flight Center (GSFC)
- ◆ NASA Jet Propulsion Laboratory (JPL)
- ◆ United States Geological Survey (USGS)
- ◆ US Global Change Research Program
- ◆ USGS Global Visualization Viewer (GloVis)
- ◆ Warehouse Inventory Search Tool (WIST)